Claims

[c1] 1. A method comprising the steps of:

receiving at least M information-bearing signals; and

processing the at least M information-bearing signals for providing an optical wavelength division multiplexed signal having at least (N)(M) channels such that each information bearing signal is associated with a different N channels, where N is greater than or equal to two.

[c2] 2. The method of claim 1 wherein the processing step further comprises the steps of:

processing each of the at least M information-bearing signals with N encoders for multiply encoding each of the at least M information-bearing signals onto the different N channels; and

multiplexing the (N)(M) encoded signals for providing the optical wavelength division multiplexed signal.

[c3] 3. The method of claim 1 wherein N is equal to two.

[c4] 4. The method of claim 3 wherein the processing step further comprises the steps of:

creating from the at least M information-bearing signals, M optical signals on M of the at least 2M channels;

inverting each of the at least M information-bearing signals for providing M inverted signals;

creating from the M inverted signals, M inverted optical signals on the remaining at least 2M channels; and

multiplexing the M optical signals and the M inverted optical signals for providing the optical wavelength division multiplexed signal.

[c5] 5. A method comprising the steps of:

demultiplexing a received optical wavelength division multiplexed signal comprising at least (N)(M) channels, wherein N is greater than or equal to two; for providing at least M groups of N optical signals;

processing each of the M groups of N optical signals to provide an

output signal.

[c6] 6. The method of claim 5 wherein N is equal to two.

[c7] 7. The method of claim 6 wherein the processing step further comprises the step of differentially decoding each of the M groups of two optical signals to provide the output signal.

[c8] 8. Apparatus comprising:

a number of encoders for multiply encoding each of at least M information-bearing signals onto N optical channels, where N is greater than or equal to two;

a multiplexer for providing an optical wavelength division multiplexed signal having at least (N)(M) optical channels.

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[c9] 9. The apparatus of claim 8 wherein N is equal to two.

[c10] 10. The apparatus of claim 9 wherein the number of encoders comprises M inverters for inverting each of the at least M information-bearing signals to provide M inverted signals.

[c11] 11. The apparatus of claim 10 further comprising:

M electrical to optical converters for converting each of the at least M information-bearing signals into M optical signals on M different optical channels; and

M electrical to optical converts for converting each of the at least M inverted signals into M inverted optical signals on another M different optical channels.

[c12] 12. Apparatus comprising:

a demultiplexer for demultiplexing a received optical signal comprising at least (N)(M) optical channels, wherein N is greater than or equal to two, for providing at least M groups of N optical signals; and

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a decoder for processing each of the M groups of N optical signals to

provide an output signal.

[c13] 13. The apparatus of claim 12 wherein N is equal to two.

[c14] 14. The apparatus of claim 13 wherein each decoder is a differential detector.